

XX. *Supplementary Notes on Dr. Fritz Müller's paper on a new form of larvæ of Psychodidæ (Diptera), from Brazil.* By the Rev. ALFRED E. EATON, M.A., F.E.S.

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WITH regard to Dr. Fritz Müller's memoir on *Maruina*, any remarks on my part must be limited to the affinities of the imago; because illness and consequent absence from England have hitherto prevented my forming even the slightest acquaintance with the earlier stages of *Psychodidæ*. And now in respect of the imago of *Maruina*, supposing that the author's illustrations of the flies seem open to criticism, all that one can do, without having seen specimens and in the absence of verbal description of the genus and species, is to point out where in his figures possible errors or defects may be reasonably apprehended, and indicate causes likely to have led to their being made if they really were made. The absence of descriptions alluded to, arose through Dr. Müller having been unable to complete his study of the flies.

Details of imagines of *Maruina* are delineated in the second plate (pl. xi.) accompanying the memoir. Figs. 11 to 13 and 18 to 20 concern *M. pilosella*; figs. 14 to 17, *M. spinosa*. On a general survey of them, one would gather from fig. 12 that the flies belong to the Subfamily *Psychodinæ* (Etn., Ent. Mo. Mag. for Sept. 1895), because the radio-cubital nerve-trunk meets the subcosta at an acute angle close to the base of the wing: figs. 11 and 20 would be referred to a species of *Psychoda* allied closely to *Ps. phalænoides*, L., the former representing the attitude of the living* fly at rest; and the latter figure genitalia of a pattern very characteristic of such *Psychodæ*: while fig. 16 points suspiciously to the possibility of a species of the miscellaneous genus *Pericoma* having furnished some details for the illustration of *Maruina*. Attention would also be arrested by

* A touch of shading would adjust the pose of the antennæ.—A. E. E.

fig. 19: first, on account of the sex assigned to it in the explanation of the plate, and afterwards in connection with the suspicion of plurality of type suggested by fig. 16.

Fig. 19 is attributed to the ♀, and fig. 20 to the ♂ of *M. pilosella*. The latter is an excellent representation of the apex of the abdomen of a male *Psychoda*, viewed rather obliquely from the side, the artist omitting hairs and (doubtless because they did not show to advantage in that posture) the superior genital appendages. Fig. 19, however, has no resemblance to the female genitalia of any *Psychodidæ* hitherto described: therefore, if everything be correct, the insect is most remarkable. But if it be allowable to assume the possibility of error in the explanation of the figure, one is led to enquire whether the mistake concerns the artist's record of the species, or only that of the sex of the original specimen. The wrong sex might easily have been entered by a slip of the pen on the original drawing at the time of its execution; or it might have been introduced into the explanation of the figure at a later date, through an oversight or lapse of memory. From the nature of the figure, it seems likely that one of these things happened, and that the figure concerns male genitalia, viewed from above: and if it can be reconciled with the corresponding view of these parts in a *Psychoda*, there is no ground for supposing that the error in the artist's record extended to the species of the specimen. One might even entertain the supposition that figs. 19 and 20 were different views of the same specimen, designed by the artist to be supplementary to each other. In favour of this hypothesis, one may point to the lower portion of the figure, which resembles, in outline and in the contour of its lowest border, the forceps-basis or subgenital plate of a male *Psychoda*—the artist omitting sundry hairs and the ill-focussed inferior genital appendages (which are sufficiently displayed in the other figure), but showing the places of their articulation with the basis. And then in the upper portion of the figure, one may trace considerable resemblance to a pair of superior genital appendages inflexed obliquely downwards towards a sheathed penis—the appendages comparable to those of *Ps. sexpunctata*, Curt. (figured Ent. Mo. Mag., 2nd ser., vol. v., pl. iv.,

Ps. 4), but more robust. Yet it is difficult, under the hypothesis advanced, to explain everything in the interior parts of the figure—what that is, for example, into which the apical joints of the supposed superior appendages are clenched. If they overlaid instead of underlying the lines that cross them in the figure, things would be more intelligible; and, therefore, it is quite possible that the perspective of these details in the original drawing was at fault. A figure of such intricacy as fig. 19 can rarely be elaborated symmetrically directly from the specimen, with true regard to effect, owing to the parts being not all in one plane, and owing to the consequent optical distortion produced by the necessary shifting of focus during the progress of the work; and when obliged to have recourse to duplicated tracings for the composition of a figure, or to combined tracings of detached details, the most skilful professional artists often experience great difficulty in bringing all the parts into their proper bearings, and are liable to fail in achieving this without advice from a specialist in the same class of subjects.

The attitude of the living fly in repose (fig. 11) and Dr. Müller's remarks about it, quite bears out the supposition that *M. pilosella* may be a *Psychoda*: species related to *Ps. phalænoides* adopt the same attitude, or almost exactly the same, during life—the antennæ divergent slightly forwards from the prone head, and the wings almost vertically deflexed alongside of the legs. In death, or when they "sham dead," the antennæ in these species are thrown back beside the legs below the deflexed wings. But some of the other species (e.g., *Ps. humeralis*) assume this posture only when dead or shamming death: during life they have the gait of a *Pericoma*, carrying the wings sub-horizontally divergent from the fold of deflection.

In specimens that have died with the wings deflexed (occasionally some die with them erect), it is often difficult to get rid of the twist in the wing and force it to lie out flat enough for the tracing of neuration to be accomplished with exactitude. Dr. Müller, judging from fig. 12, seems to have encountered this difficulty: the wing-membrane is represented as cockled up in parts, and the nervures partly out of focus. If the figure be compared with the figures of wings of *Ps. albipennis*

(Ent. Mo. Mag., 2nd ser., vol. v., pl. iv., figs. *Ps.* 3, ♀), great disparity is noticeable in the relative breadth and acuteness of the wings; and although fig. 12 may be rather too narrow (through insufficient expansion) and the others rather too broad (having been photo-lithographed from tracings pasted and rolled out upon card-board, which spread under pressure of the roller), one must not expect, when all this is allowed for, that the original of fig. 12 had exactly the same shape as the wing of the European *Psychoda*. Perhaps it conforms to the wing of the North American *Ps. nigra*, Banks, described in "The Canadian Entomologist," xxvi., 331 (1894). A wave in the membrane seems to have brought the free termination of the radial sector nearer to the cubitus (in fig. 12) than it would have been otherwise (compare the upper fig. *Ps.* 3, cited above); for there is no instance recorded of the sector being annexed to the cubitus in *Psychodidæ*. And with regard to the pabrachial nerve, it may be well to quote what is said by Baron Osten Sacken, *in litt.*, respecting the original pencil drawing of fig. 12: "The branch of the pabrachial fork was represented as stunted, but a vestige of a prolongation was nevertheless visible, the pencil drawing of which Dr. Müller had apparently rubbed out. . . . This vestige, . . . I think, was a mistake." It was, therefore, eliminated, in proving, from the lithograph; but in the unrevised "proof," the vestige is prolonged from the abrupt end of the branch, inwards to the main nervure. For anything questionable thereabouts, and for the semblance of the merging of the pabrachial and postical nervures into a common trunk, the wave and concomitant fold in the membrane may fairly be held responsible. The region of the basal cells and radio-cubital stem needs further exploration; but so far as one can judge, the neuration would be brought by correction of fig. 12 into essential conformity with that of a *Psychoda*.

The head of *Maruina spinosa* (fig. 16), judging from the antennæ, resembles that of species ranked in the first and second sections of *Pericoma*: the haunts of the fly, mentioned by Dr. Müller, are in favour of the species belonging to the latter section. It might be well to note the arrangement of the hairs on the scape of the antenna, when the original locality is searched for the

species, because (if the figure is exact) they might afford a clue to its position in the section.

Referring once more to fig. 19, in connection with the suspicion attachable to it of being possibly derived from a species of *Pericoma* (to which allusion was made above in the preliminary survey of the plate): the absence of a forceps-basis seems quite conclusive against such a suspicion. For this hypothesis would require the homologies ascribed to the parts in the earlier portion of this note to be transposed, so that what was there taken to be ventral would become dorsal, and *vice versa*. The first explanation seems much the most probable.

So far then as one can judge from the figures, *Marwina pilosella* is likely to be a species of *Psychoda* allied to, but perhaps subgenerically distinct from, *Ps. phalænoides*; and *M. spinosa* a species of the second section of *Pericoma*, or less probably of the first section. These two so-called genera comprise a considerable number of subgenerical types recognisable by differences in the imago; and it would not be surprising were it found that these types are distinguishable also by differential characters in the larvæ or pupæ.